

Course Title: Electronics Engineering II

Course Code: EEEG 214

Credit Hours: 3

Course Description:

This course extends the treatment of electronics engineering covered in the earlier courses.

Course Contents:

Unit 1: Feedback

Derivation of general expression; Effects of negative feedback; Methods of deriving and feeding; Typical circuits; Positive feedback; The condition for oscillation; The Barkhausen criterion; Simple LC and RC oscillator circuits

Unit 2: Oscillators and Waveform Generators

Sine wave oscillators; Practical consideration towards realization of sine wave oscillators; The phase shift oscillator; Wien bridge oscillator; General form of oscillator configuration; Amplitude stabilization; LC tuned oscillator-Colpitts and Hartley oscillator, Crystal oscillator; Waveform generators- square wave generator, Schmitt trigger, Triangular wave generator, Saw tooth wave generator; Voltage controlled oscillator using IC566; Introduction to square wave modulation

Unit 3 : Nonlinear Analog Circuits

Logarithmic and exponential amplifier; Logarithmic multiplier; Two and four quadrant multipliers; Phase locked loop; Precision rectification and precision clamp; Voltage to frequency and frequency to voltage conversion

Unit 4: Logic Circuits

Simple circuits for logic gates, DTL, RTL, TTL; Characteristics of TTL and CMOS integrated circuit logic families; Typical circuits; Pull up/pull down resistors; Fan in and fan out

Unit 5: Integrated Circuit Fabrication

Monolithic integrated circuit technology; The planar process; BJT, FET, CMOS, Diode, Resistor and capacitor fabrication; Characteristics of IC components, IC packaging; Microelectronic circuit layout

Unit 6: Pulse Generation and Wave Shaping Circuits

Monostable, Bistable, and astable multivibrators; the 555 timer integrated circuits; Derivation of delay and frequency formulae; Applications

References:

1. Jacob Millman and Arvin Grabel, *Microelectronics*, McGraw Hill
2. Robert Boylestad and Louis Naskelski, *Electronic Devices & Circuit Theory 6th Ed*, PHI
3. Mark N Horenstein, *Microelectronic Circuits & Devices 2nd Ed*, PHI
4. Gayakwad, *OP Amp and Linear Integrated Circuits*, TMH
5. Schilling and Belove, *Electronics Circuits*, McGraw Hill Book Company